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AUTHOR Feldman, Carol Fleisher
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ABSTRACT

The purpose of the present study was to compare performance of bilingual and monolingual children on certain language-related skills. Fifteen children between the ages of three years, eight months, and seven years were matched for age and sex in each of the following four groups: middle-class monolinguals, lower-class monolinguals, Spanish-English bilinguals (Mexican), and Inupiat-English bilinguals (Alaskan Eskimo). A test, a "name game," was administered, which consisted of three theoretically distinct tasks, each of which had a labeling and a relational component. The three tasks involved: (1) switching common names, (2) using regular common names, and (3) learning nonsense names. The findings showed that: (1) individual labeling skills surpassed relational skills in almost all cases; (2) the differences between performance in the two tasks were found to be significant for the bilinguals and middle-class monolinguals but not significant for lower-class monolinguals in the switched-labeling task; (4) the two bilingual groups and the lower-class monolingual group performed equivalently on the nonsense-labeling task; and (5) the middle-class monolinguals equalled or surpassed all other groups in all tasks. (CFM)

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THE EFFECTS OF MONOLINGUALISM VS. BILINGUALISM ON CATEGORIZATION BEHAVIOR

Carol Fleisher Feldman
The University of Chicago

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The present study is an attempt to replicate an earlier study comparing performance of bilingual and monolingual children on certain language-related cognitive skills (Feldman, 1969). In the first study, knowledge of two languages was shown to be related to the mature insight of seeing labels as arbitrary and dependent upon a speaker's use of them, rather than as fixed attributes of an object they name. This awareness was seen reflected in the bilinguals' ability to switch names and to use names in relational statements.

Method

Subjects

In the present study fifteen children between the ages of three years, eight months and seven years, zero months were matched for age and sex in each of the following four groups: middle-class monolinguals, lower-class monolinguals, Spanish-English bilinguals (Mexican), and Inupiat-English bilinguals (Alaskan Eskimo). The middle-class monolinguals were from a YMCA group on Chicago's South Side; the lower-class monolinguals were Negroes from an urban elementary school and a daycare center on Chicago's South Side. The other two groups are also considered lower class. The Mexicans were recruited from a neighborhood center and a summer Headstart program in Chicago's near-north area, and the Eskimos were from Wainwright, Alaska. Since the Mexicans in particular were judged socially immature, one-third of the lower-class monolinguals were drawn from a sample of children who had never attended Head Start classes and were judged socially less mature by their teacher. The rest were chosen at random from the daycare center and the elementary school as a whole. There were nine male and six female subjects in each group. This unequal distribution and the large range in ages were determined by the small

number of Eskimo children who were available.

The earlier study was undertaken with only lower-class Spanish-English bilinguals and Negro monolingual children. The Inupiat-English bilinguals were included in this study to test the generality of the findings for another bilingual group. The middle-class monolingual group was added to test the effect of socio-economic levels on the previous results and to clarify further the position that the presence of two language codes accounts for the differences in cognitive skills.

Bilingualism was established on two criteria: 1) the presence of an adult in the child's household who spoke only Spanish or Inupiat to the child, and 2) the child's ability to answer simple questions, such as, "What is your name?" in the home language. Apart from ascertaining that English was the child's second language, there was no attempt to establish the nature of the child's bilingualism, for example, the relative dominance of each language, etc. The test was administered in English to all subjects.

Procedure

The test, a "name game," consists of three theoretically distinct tasks, each of which has a labeling and a relational component. Objects are presented in pairs, and the subject is required to point to one of the pair of objects named and to put one object on top of another according to instructions. The three tasks involve: 1) switching common names, 2) using regular common names, and 3) learning new nonsense names. For example, in the switching task a hammer and a nail are presented and named. The child is told that the hammer is to be called "nail" and the nail, "hammer." He is then asked which is "called nail" and which is "called hammer." This is the labeling task. For the relational task the child is instructed to "put the one we called hammer on the one we called nail," and vice versa. After that he is asked which one is "really a hammer" and "really a nail" and asked to "put the one that is really a hammer on the one that is really a nail." This sequence is repeated for a second pair of

common objects.

For the nonsense-name task a third pair of common objects is presented (pencil and book) and each object is given a one-syllable name that is a nonsense name in all three language (e.g., "wug" and "bik"). The child is asked to point to the object called "wug" and the object called "bik," and then asked to place these two objects in relation to each other (e.g., put "wug" on "bik"). He is then asked to point to and relate the same common objects when identified by their common names. The same procedure is repeated with another pair of objects. Thus, the highest possible score for switching and for nonsense-naming was four correct answers. Measures of comprehension of English common names were elicited on two occasions: following the switched naming task, and following the nonsense-naming task, with a possible score of four responses in every case.

From the first study it was expected that the labeling ability would exceed relational ability, since the former is theoretically and practically prior to the latter. In labeling ability it was expected that the bilingual groups would: 1) surpass the lower-class monolinguals in the switched-names task, 2) equal them in nonsense-label learning, and 3) equal or slightly trail the lower-class monolinguals in regular common-name knowledge. Also, bilinguals were expected to perform better than lower-class monolinguals on the relational tasks. However, the middle-class monolinguals were expected to perform better than the other three groups on all tasks.

Results

Table 1 shows that individual labeling skills do indeed surpass relational skills except for one case in the middle-class monolingual group (where the scores are equal), and two cases among the lower-class monolinguals (one where they are equal and one where relational slightly exceeds labeling performance). When the scores are grouped, as in Table 2, the

differences between performance in the labeling and relational tasks are found to be significant ($p < .005$) for the bilinguals and the middle-class monolinguals, and in the correct direction, although not significant, for the lower-class monolinguals.

On labeling tasks the three hypotheses were only partially borne out by the data. As Figure 1A shows, both bilingual groups performed better than the lower-class monolinguals on the switched-labeling task; the results were not, however, statistically significant. As expected, the two bilingual groups and the lower-class monolingual group performed equivalently on the nonsense-labeling task. Table 1 shows that on common-labeling these three groups performed substantially equally on the common-naming after the relational task; but the Mexican and Alaskan bilinguals trailed the lower-class monolinguals on common names after the switching task. The differences were significant between the Mexican group and the lower-class monolinguals ($p < .05$) and bordered on significance ($p < .077$) between the Alaskan and lower-class monolingual groups.

As predicted, the middle-class monolinguals equalled or surpassed all other groups (Table 1, Figure 1A). They performed significantly better than the lower-class monolinguals ($p < .005$), the Mexican bilinguals ($p < .05$), and the Alaskan bilinguals ($p < .01$) on the switched-labeling tasks. On the tasks involving common labels after switching, the middle-class monolinguals exceeded the Mexicans ($p < .05$) and the Alaskans ($p < .077$) and equalled the lower-class monolinguals. On nonsense-labeling and common-labeling after nonsense-labeling, all four groups performed equivalently.

On relational tasks (Figure 1B) the bilinguals did not, in general, perform better than the lower-class monolinguals as the hypothesis predicted. In fact, on these tasks the profiles of the two bilingual

groups are so dissimilar that they will be reported separately. The Mexican bilinguals surpassed the lower-class monolinguals on switched-relational skills, but not significantly. The Mexican bilinguals equalled the lower-class monolinguals in their ability to use nonsense names in relational sentences. On common-name relational ability they trailed the lower-class monolinguals significantly ($p < .025$) on common names after switched, but nonsignificantly on common names after nonsense. This pattern of performance on relational tasks between lower-class monolinguals and Mexican bilinguals is the same one found on the labeling tasks between lower-class monolinguals and both bilingual groups (bilinguals better, but not significantly, on switching, equal on nonsense, not significantly different on common after nonsense, and significantly worse on common after switching).

The Eskimos deviate from this pattern on relational tasks, trailing all other subject groups. On switched-relational they were significantly worse than the middle-class monolinguals ($p < .01$), the lower-class monolinguals ($p < .055$), and the Mexican bilinguals ($p < .05$). On the nonsense skill their deficit was not, however, significant. On relating common names after nonsense, the Alaskans trailed the middle-class monolinguals ($p < .01$) and lower-class monolinguals ($p < .005$) significantly and fell below the level of the Mexican bilinguals, although not significantly. The Alaskans also performed worse on relating common names after switching. The differences were significant with the middle-class monolinguals ($p < .005$) and the lower-class monolinguals ($p < .005$) and tended in the same direction with the Mexican bilinguals ($p < .09$).

As Figure 1B indicates, on relational tasks also the middle-class monolinguals performed generally higher than the other groups although not always significantly. In no skill category, however, was their advantage over the lower-class monolinguals significant. They were significantly better than the Mexican bilinguals only on relating common

names after switching ($p < .01$).

Discussion

We predicted that having two names for an object makes it easier to perceive labels as independent of the objects they name and dependent on the language user. This is a mature concept of the nature of verbal labels which, according to Piaget, represents a loss of egocentrism and can be seen to be critical for higher-order symbol manipulation. While in the switching task we are juxtaposing symbols (labels) on concrete objects, in relational sentences we can be seen to be performing analogous switching operations on the symbols (labels) themselves, within a syntactical system -- the English word order.

Thus, we expected that the Mexican and Alaskan bilinguals would perform better on the switched-labels task and on relational questions than the lower-class monolinguals. Although Figure IA bears out this prediction on the switched-labels task, the t-tests did not establish significance. Examining the data more closely, we discovered that for the lower-class monolinguals, the Mexican bilinguals, and to a lesser extent the Eskimo bilinguals, the frequency distributions of scores on the switched-labeling task are clearly bimodal (Figure IIA). Scores are predominantly 4 or 0, all correct or all wrong. This accounts, we believe, for the failure of the t-tests to show significance on the advantage of the bilinguals over the lower-class monolinguals on switching labels. The advantage of the bilinguals on this task is more impressive when compared to their standing on the common-naming after switching task. Their scores indicate a deficit in knowledge of certain common English terms. The bilinguals' performance on nonsense-labeling shows they have no problem learning new names, however. If for the switched-labeling task the bilinguals must first learn the common names before switching them, then their advantage over the lower-class monolinguals who already know the

common names is indeed remarkable.

As described previously, the expected general superiority of the bilinguals over the lower-class monolinguals on relational tasks was not sustained. Instead, the Mexicans' profile of scores on relational skills followed their profile on labeling tasks. This seems reasonable since a knowledge of the labels is necessarily a prerequisite to manipulating them in relational sentences. This interpretation finds support in the results of the previous study (Feldman, 1969) where bilinguals were found to be superior in relational skills only when they had mastered labeling ability at a high level. In that study, with one exception, a threshold effect was obtained: the relational score was 50% or higher only when the labeling score reached 85%.

With the distribution of switching scores bimodal as in the present study, a threshold effect at 85% (a score of 3.4) would mean that 85% of the sample would have to get a score of four (which is not the case) in order for the switched-relational scores for lower-class monolinguals and Mexicans to exceed 2.0 (which is the case). However, a threshold of 85% in this case is not interpretable in the same way as in the earlier study because it represents an average of disparate clumps of high and low scores. Figure 11B shows that, in fact, it is subjects with high labeling scores who have high relational scores/ and vice versa: eighty-three per cent of the lower-class monolinguals and 77% of the Mexicans who scored 4 on switched labeling also scored 4 on switched relational. Eighty-three per cent of the lower-class monolinguals and 75% of the Mexicans who scored 0 on switched-labeling also scored 0 on switched-relational (Figure 11C). Further, the "threshold effect" reinterpreted in terms of per cent of scores of 4 can be extended to the case of relationals involving common names. In this way, the Mexicans' deficient ability in the relational use of common names (when compared to the lower-class monolinguals')

can be attributed to a deficiency in the use of common names as labels.

The Eskimos present a different picture, however. Although they equalled the Mexicans in the number of subjects achieving scores of 4 on switched-labeling, the distribution of the other scores is not as sharply bimodal. Approximately 33% of the Eskimos (as compared to 20% of the monolinguals and 13% of the Mexicans) got two or three answers correct (Figure IIA). This is in itself remarkable, since seven Eskimo subjects scored a total of nine 3's, and one lower-class monolingual scored the only other 3. Six of the Eskimos' nine scores of 3 were in response to relational questions a skill Eskimos were expected to excel at but were generally weaker in than the other two groups.

A score of 3 must be considered to represent confusion in the subjects' mode of response, since the data was presented in pairs. (Likewise a score of 1 can be considered a random correct guess not based on a real apprehension of the question at hand.) The deviation of the Eskimo scores from a bimodal distribution can be seen as representing some kind of cognitive interference not present in the other two groups, which appears as a weakness in the Eskimos' scores on the relational tasks.

This apparent weakness of the Eskimo subjects in the relational task can be explained by an investigation of Inupiat. Syntactic structure as we conceive of it in English as the rules for the maneuvering of discrete symbols (words) in a given manner to produce semantic content does not exist in Inupiat. Too simply put, their "sentences" often consist of a basic word with a number of prefixes, infixes, and suffixes which render what we consider different parts of speech attributes of a noun. The English directional preposition "on" which we assumed to code a relationship between two nouns according to their position in the sentence does not exist as a separate word in Inupiat. They have instead a "localis" case with "on" as a case of the noun.

Thus, the acquisition of relational skills, which can be seen in certain languages as representing a mobile ability to use a language to express thought, can be seen to induce conflict in the application of linguistic knowledge for very young speakers of Inupiat and English, two languages where the rules for expressing relations are so different. Hence the deviation in the Eskimo scores from a bimodal distribution, the confused scores of 1 and 3, may be seen as representing vacillation from one kind of linguistic knowledge to another, knowledge which would in one case cause the child to get all answers right and in the other case, all answers wrong.

In conclusion, we have found an advantage in bilingual children over monolingual children in their ability to perform switching operations on labels ascribed to objects, which we take to indicate a more advanced notion of the nature of linguistic labels. There is, further, an equivalence or slight superiority of bilinguals over monolinguals in their ability to manipulate words relationally in a symbolic syntactic system, assuming 1) an equal familiarity with the vocabulary, and 2) no cultural conflict between the structures of the different languages. In the Mexican subjects the first condition is violated in tasks involving common names in relational sentences because their knowledge of English labels is insufficient. In the Eskimo subjects the second condition is violated, as seen in the number of scores of 3 which represent vacillation between two barely acquired kinds of linguistic knowledge which provide conflicting interpretations for the relational task.

If in English the ability to use "on" in relational sentences is evidence of the ability to use symbols mobilely, what does it reveal if this evidence is not observed in Eskimo children? One possibility is that since the use of "on" in relational statements in Inupiat does not

involve the mobile use of symbols, one can simply rule out this task as a reflection of language-related cognitive skills for Inupiat speakers. However, these children are not monolingual speakers of Inupiat. Hence we must ask what the effect is of acquiring two languages in which relational concepts are expressed in such different ways. One cannot say that both languages do not equally allow for the expression of the concept. One must also be aware of the age of the children. There can be no question that eventually, when the children are older and more fluent, they will be able to handle the relational task. The question is not whether they will eventually be able to do it, but why at this stage in their development there are so many children doing the task <u>partly</u> right. The suggestion is made that these children know two ways to make relational statements, including the correct English way, but that at this early stage the two ways are competitive because they are so different. At some later point in development, the resolution of these competitive language modes would occur and would result in some possibly facilitative new level of understanding.

References

Feldman, C. F., and Shen, M. Some language-related cognitive advantages of bilingual five-year-olds. Journal of Genetic Psychology, to be published.

TABLE 1

MEAN SCORES BY TASK FOR ALL GROUPS

Groups (n=15 for each)	Switched L	Switched R	Common (After Switched) L	Common (After Switched) R	Nonsense L	Nonsense R	Common (After Nonsense) L	Common (After Nonsense) R
Middle-class Monolinguals	3.7	2.7	3.9	3.9	3.7	3.6	4.0	3.7
Lower-class Monolinguals	2.0	2.1	3.9	3.7	3.7	3.3	4.0	4.0
Mexican Bilinguals	2.7	2.3	3.2	2.9	3.7	3.3	3.9	3.5
Eskimo Bilinguals	2.4	1.1	3.5	2.1	3.6	3.1	4.0	2.9

L = Labeling Task
R = Relational Task

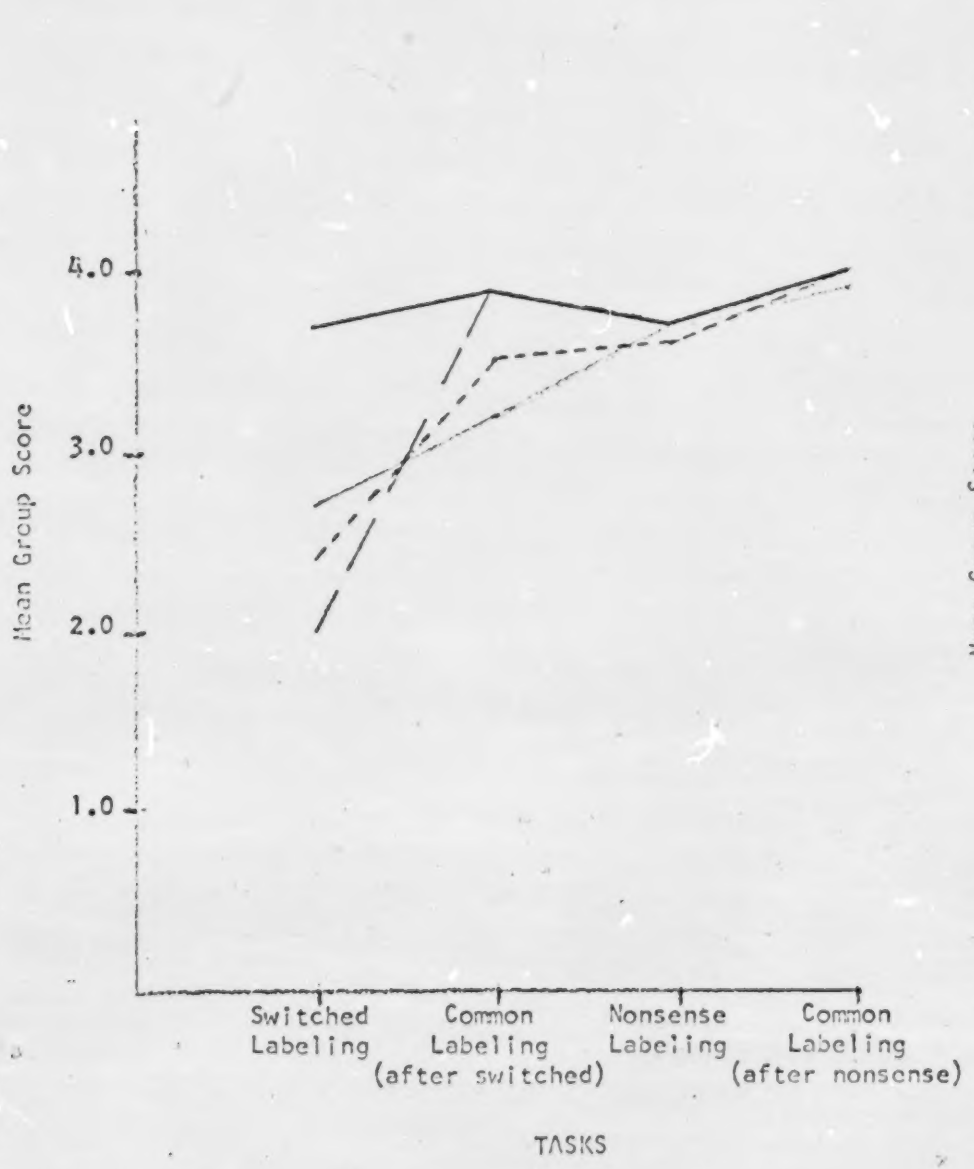
TABLE 2

MEAN SCORES ON LABELING TASKS AND RELATIONAL TASKS FOR ALL GROUPS

Groups (n = 15 for each)	Labeling	Relational	L > R
Middle-class Monolinguals	3.8	3.5	$p < .005$
Lower-class Monolinguals	3.4	3.3	$p < .09$
Mexican Bilinguals	3.4	3.0	$p < .005$
Eskimo Bilinguals	3.4	2.3	$p < .005$

FIGURE 1

Mean Scores on Labeling and Relational Tasks for All Groups:
Middle-class Monolinguals, Lower-class Monolinguals, Mexican Bilinguals, and Eskimo Bilinguals



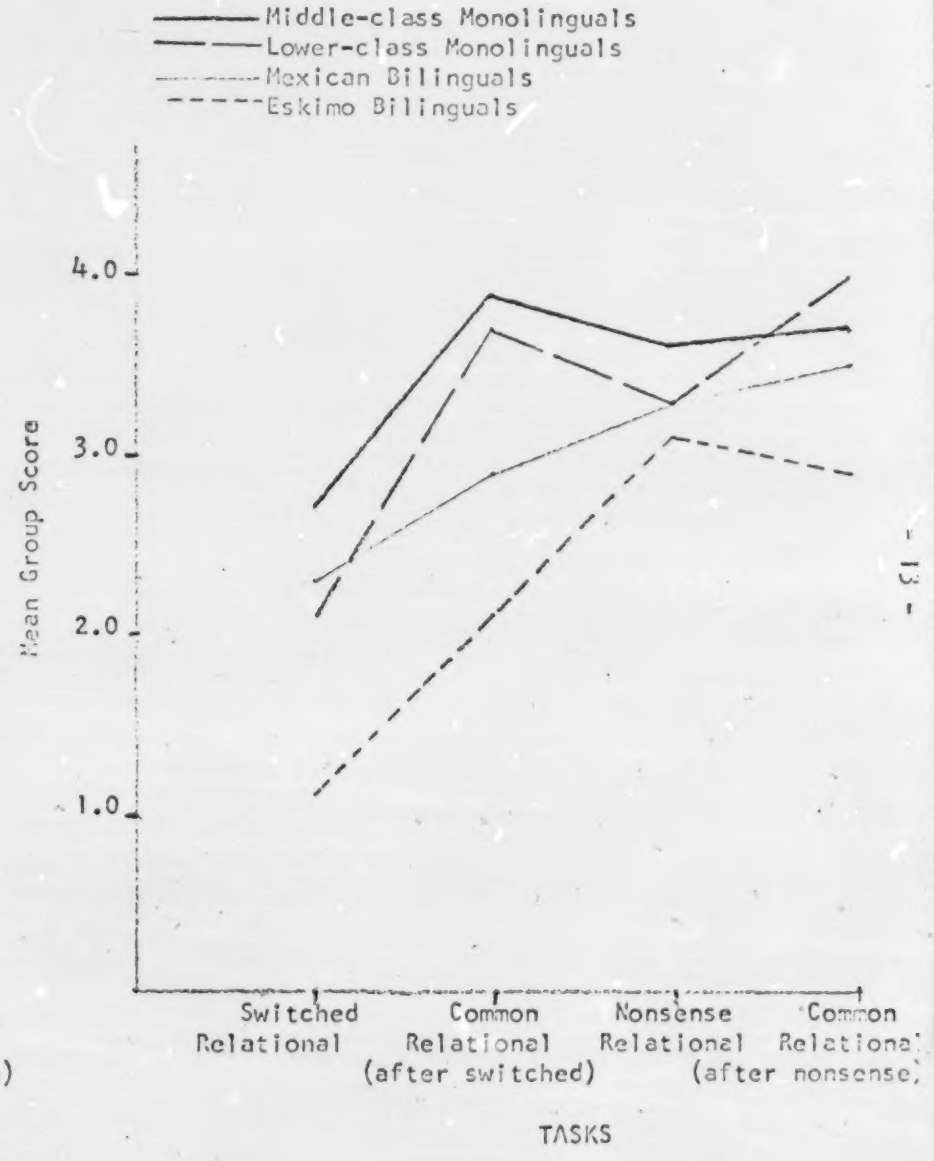


FIGURE IIA

Frequency Distribution of Scores on Switched-Labeling Task
By Groups

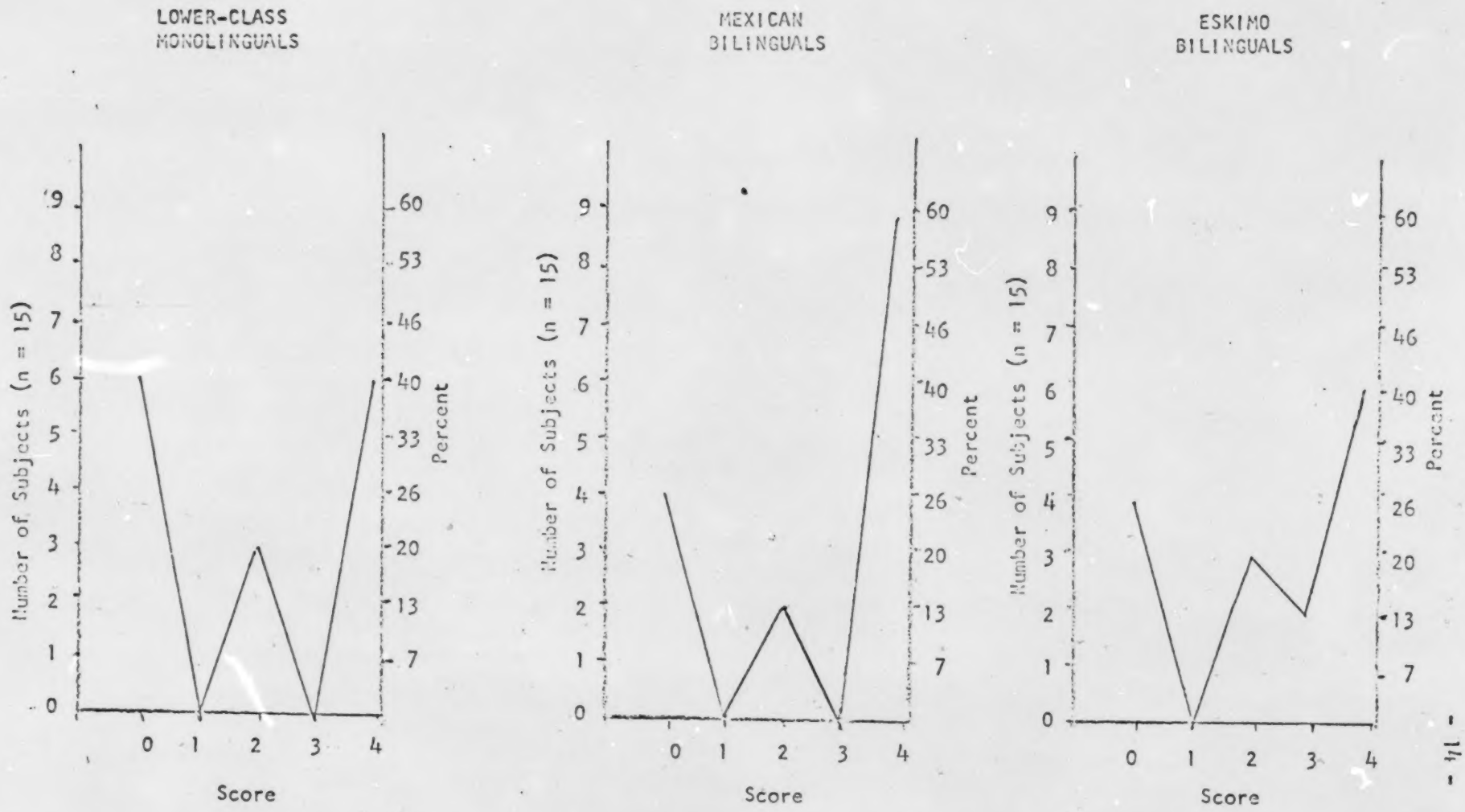

LOWER-CLASS MONOLINGUALS
MEXICAN BILINGUALS
ESKIMO BILINGUALS
Number of Subjects (n = 15)
Percent
Score
0 1 2 3 4
0 1 2 3 4 5 6 7 8 9
7 13 20 26 33 40 46 53 60

FIGURE 11B

Frequency Distribution of Scores on Switched-Relational Task
of Subjects Who Scored 4 on Switched-Labeling Task
By Groups

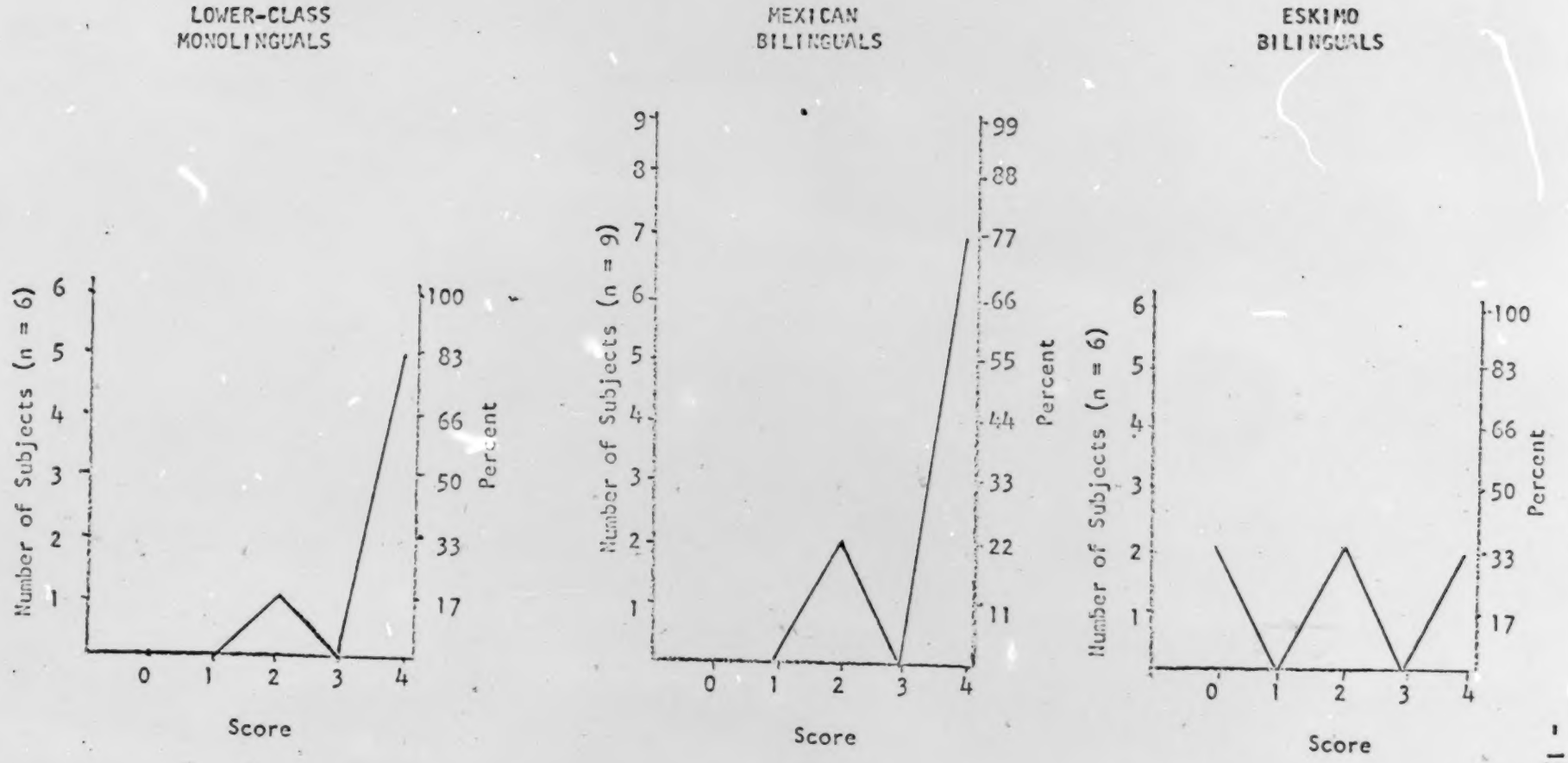

LOWER-CLASS MONOLINGUALS
MEXICAN BILINGUALS
ESKIMO BILINGUALS
Number of Subjects (n = 6)
Number of Subjects (n = 9)
Number of Subjects (n = 6)
Percent
Score
0 1 2 3 4
1 2 3 4 5 6
1 2 3 4 5 6 7 8 9
17 33 50 66 83 100
11 22 33 44 55 66 77 88 99

FIGURE IIC

Frequency Distribution of Scores on Switched-Relational Task
of Subjects Who Scored 0 on Switched-Labeling Task
By Groups